Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (currently amended) A method of measuring a thickness of a tissue, the method comprising:

directing a measurement light beam along an optical path toward the tissue;

providing a structure along the optical path;

selecting three wavelengths of light corresponding with wavelengths of a Fourier series with the structure;

reflecting the three wavelengths of light from the tissue ~~by directing a measurement light beam along an optical path toward the tissue~~;

measuring an interference signal for each of the three wavelengths of the reflected light; and

determining a separation distance between positions of at least two reflecting tissue surfaces along the optical path by combining the measured interference signals.

2. (currently amended) The method of claim 1 further comprising:

determining an intensity of the reflected light beam at several positions along the optical path by combining the measured interference signals; and

wherein the measurement light beam comprises the three wavelengths of light simultaneously directed along the path toward the tissue, and wherein the three interference signals are measured simultaneously.

3. (currently amended) The method of claim 1 wherein the Fourier series corresponds to a distance along the optical path, and each of the three wavelengths of light undergoes an integer number of oscillations over the distance along the optical path. ~~further comprising determining a frequency component of a Fourier series from the interference signal of each of the three wavelengths~~

4. (currently amended) The method of claim 3 further comprising:

transforming the measured interference signals ~~the frequency components of the Fourier series~~ to spatial position components by taking an inverse Fourier transform using the measured interference signals, the spatial position components describing positions and intensities of the light beam reflected from the tissue along the optical path.

5. (original) The method of claim 1 further comprising determining a tomography of the tissue by directing the measurement beam to several locations of the tissue, the locations having at least two reflecting tissue surfaces along the optical path.

6. (original) The method of claim 5 further comprising:

scanning the light beam from a first location to a second location, wherein the first location and the second location are among the locations used to determine the tomography of the tissue.

7. (currently amended) A method of treating a tissue, the method comprising:

directing an ablative light beam to the tissue to form a desired shape in the tissue;

providing a structure along an optical path;

selecting three wavelengths of light to correspond with wavelengths of a Fourier series with the structure;

reflecting the three wavelengths of light from the tissue by directing a measurement light beam along [[an]] the optical path toward the tissue;

measuring an interference signal for each of the three wavelengths of the reflected light; and

determining positions of at least two reflecting tissue surfaces along the optical path by combining the measured signals while the ablative light beam is directed toward the tissue. [[;]]

8. (currently amended) The method of claim 7 further comprising:

determining an intensity of the reflected light beam at several positions along the optical path; and

wherein the measurement light beam comprises the three wavelengths of light simultaneously directed along the path toward the tissue and wherein the three interference signals are measured simultaneously.

9. (currently amended) The method of claim 7 wherein the Fourier series corresponds to a distance along the optical path, and each of the three wavelengths of light undergoes an integer number of oscillations over the distance along the optical path. ~~further comprising determining a frequency component of a Fourier series from the interference signal of each of the three wavelengths,~~

10. (currently amended) The method of claim 9 further comprising:

transforming the measured interference signals ~~the frequency components of the Fourier series~~ to spatial position components by taking an inverse Fourier transform using the measured interference signals, the spatial position components describing positions and intensities of the light beam reflected from the tissue along the optical path.

11. - 14. (Canceled)

15. (currently amended) A system for measuring a thickness of a tissue, the system comprising:

a light source emitting a measurement light beam, the measurement light beam directed along an optical path toward the tissue, three wavelengths of the light beam reflecting from the tissue;

a structure disposed along the optical path, the structure selecting the three wavelengths of light to correspond with wavelengths of a Fourier Series;

an interferometer generating an interference signal for each of the three wavelengths of the measurement light beam reflected from the tissue; and

a processor determining a separation distance between positions of at least two reflecting tissue surfaces along the optical path by combining the measured interference signals.

16. (currently amended) The system of claim 15 wherein:

the processor determines an intensity of the reflected light beam at several positions along the optical path;

the measurement light beam comprises the three wavelengths of light simultaneously directed along the path toward the tissue; and

~~wherein~~ the three interference signals are measured simultaneously.

17. (currently amended) The system of claim 15 wherein ~~the interference signal of each of the three wavelengths is used to determine a frequency component of a Fourier series~~ the Fourier series corresponds to a distance along the optical path and each of the three wavelengths of light undergoes an integer number of oscillations over the distance.

18. (currently amended) The system of claim 17 wherein the processor transforms the measured interference signals ~~frequency components of the Fourier series~~ to spatial position components with an inverse Fourier transform using the measured interference signals, the spatial position components describing positions and intensities of the light beam reflected from the tissue along the optical path.

19. (original) The system of claim 18 further comprising an optical system directing the measurement beam to several locations of the tissue so as to determine a tomography of the tissue, the locations having at least two reflecting tissue surfaces along the optical path.

20. (original) The system of claim 19 further comprising:

wherein the optical system scans the light beam from a first location to a second location, and wherein the first location and the second location are among the locations used to determine the tomography of the tissue.

21. (currently amended) A system for treating a tissue, the system comprising:

an ablative light source emitting an ablative light beam;

a light source emitting a measurement light beam, the measurement light beam directed along an optical path toward the tissue, three wavelengths of the light beam reflecting from the tissue;

a structure disposed along the optical path to select the three wavelengths of light to correspond with wavelengths of a Fourier Series;

an interferometer generating an interference signal for each of the three wavelengths of the measurement light beam reflected from the tissue; and

a processor controlling the ablative light beam and determining positions of at least two reflecting tissue surfaces along the optical path by combining the measured interference signals.

22. (currently amended) The system of claim 21 wherein:

the processor determines an intensity of the reflected light beam at several positions along the optical path;

the measurement light beam comprises the three wavelengths of light simultaneously directed along the path toward the tissue; and

~~wherein~~ the three interference signals are measured simultaneously.

23. (currently amended) The system of claim 21 wherein: ~~the interference signal of each of the three wavelengths is used to determine a frequency component of a Fourier series~~

the Fourier series corresponds to a distance along the optical path and each of the three wavelengths undergoes an integer number of oscillations over the distance; and

~~wherein~~ the processor transforms the measured interference signals ~~frequency components of the Fourier series~~ to spatial position components with an inverse Fourier transform using the measured interference signals, the spatial position components describing positions and intensities of the light beam reflected from the tissue along the optical path.

24. - 26. (Canceled)

27. (currently amended) An apparatus for treating tissue comprising:

an ablative light source producing an ablative beam;

a beam delivery device directing the ablative beam onto a tissue;

a microscope having a viewing port; and

an optical pachymeter emitting a measurement light beam directed along an optical path toward the tissue, three wavelengths of the light beam reflecting from the tissue;~~, the optical pachymeter comprising~~

a structure disposed along the optical path to select the three wavelengths of light to correspond with wavelengths of a Fourier series;

an interferometer generating an interference signal for each of the three wavelengths of the measurement light beam reflected from the tissue; and~~, the pachymeter including~~

a processor determining a separation distance between positions of at least two reflecting tissue surfaces along the optical path by combining the measured interference signals.

28. (currently amended) The ablation apparatus of claim 27 wherein:

the processor determines an intensity of the reflected light beam at several positions along the optical path;

the measurement light beam comprises the three wavelengths of light simultaneously directed along the path toward the tissue; and

~~wherein~~the three interference signals are measured simultaneously.

29. (currently amended) The ablation apparatus of claim 27 wherein ~~the interference signal of each of the three wavelengths is used to determine a frequency component of a Fourier series~~ wherein the Fourier series corresponds to a distance along the optical path and each wavelength of light undergoes an integer number of oscillations over the distance, and wherein the processor transforms the measured interference signals ~~frequency components of the Fourier series~~ to spatial position components with an inverse Fourier transform using the measured interference signals, the spatial position components describing positions and intensities of the light beam reflected from the tissue along the optical path.

30. (currently amended) A method of measuring a separation distance between positions of at least two reflections along an optical path, the method comprising:

reflecting at least three wavelengths of light [[at]] from the positions by directing a measurement light beam along the optical path;

selecting the three wavelengths of light to correspond with wavelengths of a Fourier series by providing a structure along the optical path, the structure selecting the wavelengths of light;

measuring an interference signal for each of the ~~at least~~ three wavelengths of the reflected light; and

determining the separation distance between the positions of the at least two reflections along the optical path by combining the measured interference signals.

31. (New) A method of measuring a thickness of a tissue, the method comprising:

reflecting ten wavelengths of light from the tissue by directing a measurement light beam along an optical path toward the tissue;

providing a structure along the optical path;

selecting the ten wavelengths of light to correspond with wavelengths of a Fourier series with the structure;

measuring an interference signal for each of the ten wavelengths of the reflected light; and

determining a separation distance between positions of at least two reflecting tissue surfaces along the optical path by combining the measured interference signals.

32. (New) The method of claim 31 further comprising:

determining an intensity of the reflected light beam at several positions along the optical path by combining the measured interference signals; and

wherein the measurement light beam comprises the ten wavelengths of light simultaneously directed along the path toward the tissue, and wherein the ten interference signals are measured simultaneously.

33. (New) The method of claim 31 wherein the Fourier series corresponds to a distance along the optical path, and each of the ten wavelengths of light undergoes an integer number of oscillations over the distance along the optical path.

34. (New) The method of claim 33 further comprising:

transforming the measured interference signal to spatial position components by taking an inverse Fourier transform using the measured interference signals, the spatial position components describing positions and intensities of the light beam reflected from the tissue along the optical path.